REMARKS

Claims 1-11, 13-23, 26-32, 35-37, and 43-47 are pending in the subject application after entry of the amendments. Claims 1 and 35 have been amended to address informalities and 43-47 have been amended to place the subject matter within the scope of 35 U.S.C. §101. It is respectfully submitted that these amendments should be entered as the amendments place the application in better condition for allowance. In addition, the amendments do not introduce subject matter previously unconsidered by the Examiner. Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I. Objection to the Specification

The specification stands objected to for failing to provide proper antecedent basis. Claims 43-47 have been amended herein and, in light of the amendments, this objection should be withdrawn.

II. Objection to Claims 1 and 35

Claims 1 and 35 stand objected to for informalities. Claims 1 and 35 have been amended accordingly. Withdrawal of this objection is respectfully requested.

III. Rejection of Claims 43-47 Under 35 U.S.C. §112, first paragraph

Claims 43-47 stand rejected under 35 U.S.C. §112, first paragraph. Withdrawal of this rejection is requested for the following reasons. Claims 43-47 have been amended to recite "a machine-readable storage medium," which is described in the specification in such a way that the subject matter is reasonably conveyed to a person skilled in the art. In one example, the specification, at paragraph [0056] recites that systems and methods described in the specification "can be embodied in *the form of program code embodied in tangible media*, such as punched cards, magnetic tape, floppy disks, hard disk drives, CD-ROMs, flash memory cards, or other *machine-readable storage medium*, wherein, when the program code is loaded in and executed by a machine, such as a computer, the machine becomes an apparatus for practicing" the systems and methods. Accordingly, the specification describes a machine-readable storage machine that includes code. Therefore, this rejection should be withdrawn.

IV. Rejection of Claims 43-47 Under 35 U.S.C. §101

Claims 43-47 stand rejected under 35 U.S.C. §101. Withdrawal of this rejection is requested for the following reasons. Claims 43-47 have been amended to recites "a machine-readable storage medium," and, accordingly, are directed towards non-transitory media. In view of the amendments, it is respectfully requested that this rejection be withdrawn.

V. Rejection of Claims 1-11, 13-23, 26-32, and 35-37 Under 35 U.S.C. §103(a)

Claims 1-11, 13-23, 26-32, and 35-37 stand rejected under 35 U.S.C. §103(a) over Heath (U.S. 6,842,437) in view of Beshai et al. (U.S. 6,034,960) and Gehring et al. (U.S. Patent Application Publication No. 2004/0028071). Withdrawal of this rejection is requested for at least the following reason. The cited art fails to teach or suggest all aspects of the subject claims.

The subject patent application relates to spreading data communications over time to reduce the impact of relatively short duration noise. In particular, the subject application provides for reducing interference between terminals disposed in nearby satellite beams, or cells, of a communication system, during time division multiplex (TDM) transmissions, including scattering time slot data. To this end, independent claim 1 recites, "*[a] method for transmitting data in a communication system wherein the data is transmitted in a communication frame, the communication frame comprising a set of time slots, the method comprising:* ***receiving one or more scattering instructions from a gateway; dividing data corresponding to a time slot in the set of time slots into a plurality of intervals in accordance with the one or more scattering instructions, wherein each interval in the plurality of intervals comprises a duration which is shorter than a duration of the time slot; scattering at least a portion of the plurality of intervals to one or more disparate time slots in the set of time slots based upon the one or more scattering instructions, wherein the portion of the plurality of intervals are scattered non-contiguously;*** *and transmitting the data in accordance with locations of the plurality of intervals within the communication frame.*" The cited art fails to teach or suggest such features.

Heath provides a method of transmitting time division multiplexed (TDM) data from a satellite terminal to a satellite wherein the satellite terminal receives a command to transmit data during a frame, which comprises a plurality of time slots, in accordance with a time slot reordering scheme. The time slot reordering scheme spreads data from respective satellite terminals to different time slots throughout the frame. (*See* Abstract). In particular, a satellite terminal receives a time slot allocation via a satellite. The time slot allocation indicates one or

more time slots of a frame during which the satellite terminal can transmit data. (*See* col. 2, ll. 28-31). For example, a frame can include 32 time slots and the satellite terminal can be allocated time slots 0-3. As described in Heath, the satellite terminal can employ a numbering scheme to convert the time slot designations in the time slot allocation into other slots locations in the frame. The numbering schemes can spread packets in time as evenly as possible to limit jitter, reduce fragmentation, and reduce complexity of defragmentation. (*See* col. 2, ll. 29-36). In an aspect, a satellite terminal can be allocated time slots in a sequential manner. After utilization of the numbering scheme, the allocated time slots are reordered into a non-sequential manner.

In Heath, time slot locations can be illustrated as a matrix of 8 rows and 4 slots as shown in Figs. 6-10, wherein the slots in a row are consecutive in time. Satellite terminals are programmed to convert assigned slot numbers in accordance with a numbering scheme (e.g., one of the schemes depicted in Figs. 6-9) to reduce jitter and provide smoothing to consecutively numbered slots. For instance, a satellite terminal can be assigned slots 0-3 of a frame, which correspond to a top row in Fig. 10. Utilizing a number scheme, such as the scheme depicted in Fig. 6, the satellite terminal can convert the assigned slots into a other slot locations (e.g., slots 0, 8, 16, and 24), which correspond to the top row of the numbering scheme. (*See* col. 8, ll. 31-47, and Figs. 6-10).

Heath, however, fails to teach or suggest dividing data corresponding to a time slot in the set of time slots into a plurality of intervals in accordance with the one or more scattering instructions, wherein each interval in the plurality of intervals comprises a duration which is shorter than a duration of the time slot. Heath discloses a number scheme whereby a satellite terminal, sequentially assigned a set of time slots, can convert the set into non-sequential time slots for transmission. While Heath discloses a one-to-one mapping between an assigned slot and a transmission slot, Heath fails to teach or suggest dividing a time slot into a plurality of intervals. Heath operates on time slots (e.g., reorders time slots) and is silent regarding partitioning time slots into smaller portions.

Moreover, Heath fails to teach or suggest scattering at least a portion of the plurality of intervals to one or more disparate time slots in the set of time slots based upon the one or more scattering instructions. In Heath, satellite terminals employ a numbering scheme to convert assigned time slot numbers into time slots numbers actually utilized to transmit data. However, Heath nowhere discloses scattering portions of data from a time slot into disparate time slots. While Heath discloses reordering or renumbering time slots such that data to be transmitted in

one time slot (e.g., time slot 1) is scheduled to transmit in another time slot (e.g., time slot 8), Heath fails to teach or suggest moving portions of data from a time slot to disparate time slots. Rather, an entirety of the data in the time slot is moved. In view of the above, it is readily apparent that Heath fails to teach or suggest all aspects of independent claim 1.

Beshai et al. provides an Asynchronous Transfer Mode (ATM) network switch device that schedules transmission of ATM cells based on a scheduler frame concept employed in Synchronous Transfer Mode (STM). A network switch can be device on a local area network or other such network that multiplexes a plurality of network connections associated with devices to an output link coupled to another network (e.g., the Internet) or a higher level of a network topology. To switch and multiplex a plurality of input connections onto the output line, scheduler frames of fixed length can be employed. A scheduler frame is a time-space map, wherein each entry specifies a connection that has units of data queued for transmission of the output link. A position of each entry in the scheduler frame relates to a window of time during which a unit of data associated with the connection will be transmitted. (*See* Background).

In ATM, fixed-sized data packets called cells are utilized. Each cell is associated with a connection referred to as a virtual circuit or virtual path. Thus, an ATM switch, such as the switch described Beshai et al., schedules cells associated with a plurality of streams (e.g., virtual circuits) for transmission over an outgoing network link. (*See* col. 5, ll. 9-17). A link controller in the ATM switch can periodically scan a time-space map comprised of time slots whose position in the map correspond to a time at which data can be transmitted over the outgoing network link. The time slots are periodically updated with stream-number entries (e.g., virtual circuit identifiers) respectively corresponding to streams. In an example, a stream-number entry written into the Nth time slot of the time-space map corresponds to the stream associated with the Mth cell transmitted as a result of the link controller scanning the map, wherein N and M are related by a one-to-one mapping. (*See* col. 3, ll. 29-42). A scheduler of the ATM switch maintains the time-space map associated with the switch. The scheduler, for each time slot in the time-space map, assigns a stream number or virtual circuit identifier to the time slot. A cell (e.g., data packet) associated with the stream number is transmitted during the time slot. (*See* col. 5, ll. 9-58). The link controller reads or scans the time-space map to serve the streams. For instance, the link controller can sequentially scan the time-space map from top to bottom (e.g., from a first time slot to a last time slot). (*See* col. 5, ll. 40-43). To reduce delay-jitter, the link controller can scan the time-space map in a reverse-binary order. In a reverse binary order, time-slots indexes

can be represented in binary and reversed such that least significant bits become most significant bits. (*See* col. 7, ll. 28-41).

However, Beshai et al., similar to Heath, fails to teach or suggest dividing data corresponding to a time slot in the set of time slots into a plurality of intervals in accordance with the one or more scattering instructions, wherein each interval in the plurality of intervals comprises a duration which is shorter than a duration of the time slot. Beshai et al. discloses a time-space map that comprises a plurality of time slots. However, each time slot of the plurality of time slots is configured to accommodate transmission of a single cell. In ATM networks, a cell is a data packet having a fixed size. Accordingly, Beshai et al. fails to disclose dividing time slot data and, additionally, cannot divide time slot data as such data is an ATM cell which is fixed in size.

Further still yet, Beshai et al., like Heath, fails to teach or suggest scattering at least a portion of the plurality of intervals to one or more disparate time slots in the set of time slots based upon the one or more scattering instructions. In Beshai et al., a link controller scans time slots of a time-space map in a non-sequential manner. However, Beshai et al. nowhere discloses scattering data from a time slot to disparate time slots. For instance, Beshai et al. fails to disclose moving data from a time slot to a disparate time slot. In view of the above, it is readily apparent that Beshai et al. fails to teach or suggest all aspects of independent claim 1.

Gehring et al. provides a medium access control (MAC) layer protocol which can manage variable-sized time slots within a TDMA frame. In TDMA, transmit time is divided in frames having a plurality of time slots, wherein each competing device is assigned a unique and non-overlapping data slot within the frame in which only the corresponding device may transmit data. Typically, each data slot within the frame has a fixed length according to a predetermined frame length. (*See* paragraph [0010]). Gehering et al. discloses variable length data slots in a TDMA frame. A master device can assign slave devices, which request transmission resources, a variable length data slot within a frame for data transmission. (*See* paragraph [0015]). To assign a data slot, the master device provides the slave device a start time (e.g., slot start time) and a length of time (e.g., slot length). The slot start time indicates a time position, within a data slot section of the TDMA frame, at which point the slave device beings transmitting. The slot length, measured from the slot start time, provides the time position at which the slave device stops transmitting. (*See* paragraph [0024]). Over time, reallocation and/or reorganization of the data slot section of the frame can be necessary. For example, current data assignments can become

scattered across the data slot section creating a plurality of disjoint free time blocks within the data slot section. For example, five slave devices can be assigned contiguous variable-length data slots. Over time, slave device 2 and 4 can cease transmitting (e.g., no longer request resources). Accordingly, free portions between the data slots of slave devices 1 and 3, and the data slots of slave devices 3 and 5 arise. Gehring et al. discloses that these free portions can be consolidated by reassigning and/or reallocating data slots for the remaining devices still transmitting. (*See* paragraph [0031]).

However, Gehring et al., similar to Heath and Beshai et al., fails to teach or suggest dividing time slot data, and/or scattering time slot data to disparate time slots. Gehring et al. discloses variable-length data slots which can accommodate the data needs of a transmitting device. Accordingly, in view of traditional TDMA frames, Gehring et al. relates to combining data from multiple time slots into a single time slot as opposed to dividing time slot data as recited in independent claim 1. Moreover, Gehring et al. discloses reallocating data slots to consolidate free portions. Thus, Gehring et al. discloses defragmenting (e.g., de-scattering) a TDMA frame as opposed to scattering time slot data among disparate time slots. Therefore, Gehring et al. fails to teach or suggest all aspects of independent claim 1. Accordingly, the cited art fails to teach or suggest all aspects of independent claim 1. Claims 2-7 depend from independent claim 1 and are allowable for at least the reasons above.

Independent claim 8 recites, in part, "*...a receiver configured to receive one or more scattering instructions from a gateway device; a processor configured to: divide data associated with a time slot of a communication frame into a plurality of intervals in accordance with the one or more scattering instructions, wherein each interval comprises a shorter duration than the time slot; distribute the plurality of intervals among one or more disparate time slots in the communication frame based at least in part on the one or more scattering instructions, wherein the plurality of intervals are distributed non-contiguously; and a transmitter configured to transmit the plurality of intervals in accordance with locations of the plurality of intervals within the communication frames.*" A discussed supra, Heath fails to teach or suggest dividing time slot data and distributing the divided data. Rather, Heath relates to time slot numbering schemes which convert sequentially assigned time slots into non-sequential time slot locations. Beshai et al. similarly fails to teach or suggest such aspects. Rather, Beshai et al. relates to an ATM switch that reduces delay-jitter by serving scheduled streams in a non-sequential manner. Gehring et al. relates to variable-length data slots which work to consolidate data rather than divide and scatter.

Accordingly, Heath, Beshai et al., and Gehring et al. fail to teach or suggest every feature of independent claim 8 (and claims 9-11, 13, and 14 which depend therefrom).

Independent claim 15 recites, in part, "*...receiving a request from a terminal device for access to a communications channel;* ***generating a schedule of transmission for the terminal device, wherein the schedule of transmission specifies a division of data into a plurality of time intervals****, each time interval shorter in duration than a time slot of a communication frame, the schedule of transmission further specifies* ***a location of each time interval from the plurality of time intervals within the communication frame****, wherein the plurality of time intervals are located within the communication frame in a non-contiguous manner;* ***generating one or more scattering instructions in accordance with the schedule of transmission; and transmitting the one or more scattering instructions to the terminal device.***" Heath, Beshai et al., and Gehring et al. fail to teach or suggest such aspects. The cited art fails to teach or suggest generating a schedule of transmission that specifies a division of data and a location of time intervals in a communication frame. Rather, Heath discloses numbering schemes which operate to order transmission time of time slots in a non-sequential manner despite sequential allocation, Beshai et al. discloses generating a time-space map that assigns a time slot to a data packet of a stream, and Gehring et al. provides variable-length time slots. Accordingly, the cited art fails to teach or suggest every feature of independent claim 15 (and claims 16-23 which depend therefrom).

Independent claim 26 recites, in part, "*...means for generating a schedule of transmission for the terminal device, wherein the schedule of transmission specifies a partition of data into a plurality of time intervals, each time interval shorter in duration than a time slot of a communication frame, the schedule of transmission further specifies a location of each time interval from the plurality of time intervals within the communication frame, wherein the plurality of time intervals are located within the communication frame in a non-contiguous manner; means for generating one or more scattering instructions in accordance with the schedule of transmission; and means for transmitting the one or more scattering instructions to the terminal device.*" The cited art fails to teach or suggest such aspects. Heath disclose numbering schemes but fails to teach or suggest generating a schedule of transmission that specifies a partition of data into a plurality of time intervals. Beshai et al. discloses generating a time-space map; however, Beshai et al. similarly fails to disclose generating a schedule of transmission as recited in claim 26. Thus, Heath fails to teach or suggest all aspects of independent claim 26 (and claims 27-32 which depend therefrom). Moreover, Beshai et al. and

Gehring et al. fail to make up for the deficiencies of Heath with respect of claims 26-32.

Independent claim 35 recites, in part, "*...means for receiving one or more scattering instructions from a gateway; means for partitioning data corresponding to a time slot in the set of time slots into a plurality of intervals in accordance with the one or more scattering instructions, wherein each interval in the plurality of intervals comprises a duration which is shorter than a duration of the time slot; means for scattering at least a portion of the plurality of intervals to one or more disparate time slots in the set of time slots based upon the one or more scattering instructions, wherein the portion of the plurality of intervals are scattered non-contiguously...*" As discussed supra, Heath fails to teach or suggest such aspects. Moreover, Beshai et al. and Gehring et al. also fails to teach or suggest such features. Accordingly, the cited art fails to teach or suggest all features of independent claim 35 (and claims 36 and 37 which depend therefrom).

In view of at least the foregoing, it is readily apparent that the cited art fails to teach or suggest all aspects of independent claims 1, 8, 15, 26, and 35 (and respective dependent claims). Accordingly, withdrawal of this rejection is respectfully requested.

VI. <u>Rejection of Claims 43-47 Under 35 U.S.C. §103(a)</u>

Claims 43-47 stand rejected under 35 U.S.C. §103(a) over Gehring et al. in view of Beshai et al. Withdrawal of this rejection is requested for at least the following reason. The cited art fails to teach or suggest all aspects of the subject claims.

Independent claim 43 recites, in part, "*...code for causing the at least one computer to divide data associated with a time slot of a communication frame into a plurality of intervals in accordance with the one or more scattering instructions, wherein each interval comprises a shorter duration than the time slot; code for causing the at least one computer to distribute the plurality of intervals among one or more disparate time slots in the communication frame based at least in part on the one or more scattering instructions, wherein the plurality of intervals are distributed non-contiguously...*" The cited art fails to teach or suggest such aspects.

Gehring et al., as discussed supra, relates to a MAC layer protocol that manages variable-length data slots in a TDMA frame. However, Gehring et al. fails to teach or suggest dividing data associated with a time slot into a plurality of intervals. Rather, Gehring et al. discloses assigning a variable-length data slot to a device, wherein the assigned slot accommodates a complete data transmission. Thus, Gehring et al. relates to consolidating data into a time slot and

is silent regarding dividing data of a time slot into intervals.

Beshai et al. fails to cure the aforementioned deficiencies of Gehring et al. with respect to independent claim 43. Beshai et al. discloses a time-space map that comprises a plurality of time slots. However, each time slot of the plurality of time slots is configured to accommodate transmission of a single cell. In ATM networks, a cell is a data packet having a fixed size. Accordingly, Beshai et al. fails to disclose dividing time slot data and, additionally, cannot divide time slot data as such data is an ATM cell which is fixed in size.

In view of at least the foregoing, it is readily apparent that the cited art fails to teach or suggest all aspects of independent claim 43 (and claims 44-47 which depend therefrom). Accordingly, withdrawal of this rejection is respectfully requested.

CONCLUSION

The present application is believed to be in condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063 [QUALP853USA].

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicants' undersigned representative at the telephone number below.

Respectfully submitted,
TUROCY & WATSON, LLP

/Evan T. Perry/
Evan T. Perry
Reg. No. 62,190

TUROCY & WATSON, LLP
127 Public Square
57th Floor, Key Tower
Cleveland, Ohio 44114
Telephone (216) 696-8730
Facsimile (216) 696-8731